LISTING OF THE CLAIMS

1. (currently amended) An apparatus for processing image data to produce an image for covering an image area of a single display, comprising:

a plurality of graphics processors, each graphics processor being operable to render the image data into frame image data and to store the frame image data in a respective local frame buffer;

a control processor operable to provide instructions to the plurality of graphics processors; and

one or more merge units operable to synchronously receive the frame image data from the respective local frame buffers and to synchronously produce combined frame image data based thereon.

2. (original) The apparatus of claim 1, wherein at least one of the one or more merge units is operable to produce a merge synchronization signal used by the graphics processors to release the frame image data from the respective local frame buffers to the one or more merge units.

3. (original) The apparatus of claim 2, further comprising:

at least one synchronization unit operable to receive the merge synchronization signal from the at least one merge unit; and

respective local synchronization units coupled to the graphics processors and operable to receive the merge synchronization signal and to cause the release of the frame

image signal from the local frame buffer to the at least one merge unit.

4. (original) The apparatus of claim 2, wherein the merge synchronization signal is synchronized in accordance with a display protocol defining how respective frames of the combined frame image data are to be displayed.

5. (original) The apparatus of claim 4, wherein the display protocol defines at least one of a frame rate at which successive frames of the combined frame image data are displayed, and a blanking period that dictates when the combined frame image data is to be refreshed.

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6. (original) The apparatus of claim 5, wherein the merge synchronization signal includes transitions that are proximate to ends of the blanking periods such that the at least one merge unit initiates producing the combined frame image data for display at the end of at least one of the blanking periods.

7. (original) The apparatus of claim 6, wherein the transitions of the merge synchronization signal are substantially coincident with the ends of the blanking periods.

8. (original) The apparatus of claim 6, wherein the merge synchronization signal includes transitions that lead the ends of the blanking periods.

9. (original) The apparatus of claim 2, wherein:

the plurality of graphics processors are grouped into respective sets of graphics processors;

the one or more merge units include a respective local merge unit coupled to each set of graphics processors, and a core merge unit coupled to each local merge unit;

the respective local merge units are operable to synchronously receive the frame image data from the respective local frame buffers and to synchronously produce local combined frame image data based thereon; and

the core merge unit is operable to synchronously receive the local combined frame image data from the respective local merge units and to synchronously produce the combined frame image data based thereon.

10. (original) The apparatus of claim 9, further comprising:

a respective local synchronization unit coupled to each set of graphics processors and to each local merge unit; and

a core synchronization unit coupled each local synchronization unit and to the core merge unit,

wherein the core merge unit is operable to produce the merge synchronization signal used by the core synchronization unit and at least some of the local synchronization units to permit the respective sets of graphics processors to synchronously release the frame image data from the respective local frame buffers to the respective local merge units, and to permit the respective local merge units to synchronously release the local combined frame image data to the core merge unit.

11. (original) The apparatus of claim 9, wherein the control processor is operable to instruct the graphics processors and the one or more merge units to operate in one or more modes that affect at least one of (i) timing relationships between when image data are rendered, when frame image data are released from respective local frame buffers, and when frame image data are merged; and (ii) how the frame image data are merged to synchronously produce the combined frame image data.

110. (currently amended) A method for processing image data to produce an image for covering an image area of a single display, comprising:

rendering the image data into frame image data using a plurality of graphics processors;

storing the frame image data in respective local frame buffers; and

synchronously merging the frame image data from the respective local frame buffers to synchronously produce combined frame image data based thereon.

111. (original) The method of claim 110, further comprising producing a merge synchronization signal used by at least some of the plurality of graphics processors to synchronously release the frame image data from the respective local frame buffers for merging.

112. (original) The method of claim 111, wherein the merge synchronization signal is synchronized in accordance

with a display protocol defining how respective frames of the combined frame image data are to be displayed.

113. (original) The method of claim 112, wherein the display protocol defines at least one of a frame rate at which successive frames of the combined frame image data are displayed, and a blanking period that dictates when the combined frame image data is to be refreshed.

114. (original) The method of claim 113, wherein the merge synchronization signal includes transitions that are proximate to ends of the blanking periods such that the combined frame image data are available for display at the end of at least one of the blanking periods.

115. (original) The method of claim 114, wherein the transitions of the merge synchronization signal are substantially coincident with the ends of the blanking periods.

116. (original) The method of claim 114, wherein the merge synchronization signal includes transitions that lead the ends of the blanking periods.

117. (original) The method of claim 111, wherein the image data are rendered into the respective frame buffers asynchronously with respect to the merge synchronization signal.

118. (original) The method of claim 110, wherein the graphics processors can operate in one or more modes that affect at least one of (i) timing relationships between when image data are rendered, when frame image data are released

from respective local frame buffers, and when frame image data are merged; and (ii) how the frame image data are merged to synchronously produce the combined frame image data.

119. (original) The method of claim 118, further comprising instructing the graphics processors to operate in the one or more modes on a frame-by-frame basis.

120. (original) The method of claim 118, wherein at least one of the modes provides that:

one or more of the graphics processors completes rendering the image data into the respective frame buffers prior to the end of each blanking period;

one or more of the graphics processors completes rendering the image data into the respective frame buffers prior to the end of an integral number of blanking periods; and

one or more of the graphics processors includes an integral number of local frame buffers and that the one or more graphics processors completes rendering the image data into the respective integral number of frame buffers prior to the ends of a corresponding integral number of blanking periods.

121. (original) The method of claim 118, wherein the modes include at least one of area division, averaging, layer blending, Z-sorting and layer blending, and flip animation.

122. (original) The method of claim 118, wherein at least one of the modes is an area division mode providing that at least two of the local frame buffers are partitioned into

respective rendering areas that correspond with respective portions of the image area and non-rendering areas, and an aggregate of the rendering areas results in a total rendering area that corresponds with all portions of the image area.

123. (original) The method of claim 122, wherein the area division mode further provides that the at least two graphics processors complete rendering the image data into the respective rendering areas of the frame buffers prior to the end of each blanking period.

124. (original) The method of claim 122, further comprising synchronously aggregating the frame image data from the respective rendering areas of the at least two graphics processors based on alpha blending values to produce the combined frame image data, and the combined frame image data are capable of covering the image area.

125. (original) The method of claim 118, wherein at least one of the modes is an averaging mode providing that the local frame buffers of at least two of the graphics processors include rendering areas that each correspond with all portions of the image area and that the respective frame image data from the at least two local frame buffers are averaged to produce the combined frame image data.

126. (original) The method of claim 125, wherein the averaging mode further provides that the at least two graphics processors complete rendering the image data into the respective rendering areas of the frame buffers prior to the end of each blanking period.

127. (original) The method of claim 125, further comprising synchronously averaging the frame image data from the respective rendering areas of the at least two graphics processors based on alpha blending values to produce the combined frame image data, and the combined frame image data are capable of covering the image area.

128. (original) The method of claim 118, wherein at least one of the modes is a layer blending mode providing that: (i) at least some of the image data are rendered into the local frame buffers of at least two of the graphics processors such that each of these local frame buffers includes frame image data representing a portion of the combined frame image data; (ii) each of the portions of the combined frame image data are prioritized; and (iii) the method further comprises synchronously producing the combined frame image data by layering each of the frame image data in an order according to the priority thereof.

129. (original) The method of claim 128, further comprising synchronously layering the frame image data such that one of the layers of frame image data may overwrite another of the layers of frame image data depending on the priority of the layers.

130. (original) The method of claim 128, wherein the layer blending mode further provides that the at least two graphics processors complete rendering the image data into the respective frame buffers prior to the end of each blanking period.

131. (original) The method of claim 118, wherein at least one of the modes is a Z-sorting and layer blending mode providing that: (i) at least some of the image data are rendered into the local frame buffers of at least two of the graphics processors such that each of the at least two local frame buffers includes frame image data representing a portion of the combined frame image data; (ii) the frame image data include Z-values representing image depth; and (iii) the method further comprises synchronously producing the combined frame image data by Z-sorting and layering each of the frame image data in accordance with the image depth.

132. (original) The method of claim 131, further comprising synchronously layering the frame image data such that at least a portion of one of frame image data may overwrite another portion of frame image data depending on the Z-values thereof.

133. (original) The method of claim 131, wherein the Z-sorting and layer blending mode further provides that the at least two graphics processors complete rendering the image data into the respective frame buffers prior to the end of each blanking period.

134. (original) The method of claim 118, wherein at least one of the modes is a flip animation mode providing that: (i) the local frame buffers of at least two graphics processors include frame image data that are capable of covering the image area; and (ii) the method further comprises producing the combined frame image data by sequentially

releasing the respective frame image data from the at least two graphics processors.

135. (original) The method of claim 134, wherein the flip animation mode further provides that the at least two graphics processors complete rendering the image data into the respective frame buffers prior to the ends of an integral number of blanking periods.

136. (original) The method of claim 135, wherein the integral number of blanking periods corresponds to the number of graphics processors participating in the flip animation mode.

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137. (original) The method of claim 135, wherein the integral number of blanking periods corresponds to the number of local frame buffers participating in the flip animation mode.

138. (original) The method of claim 110, further comprising:

receiving at least one of a frame of the combined frame image data and at least one externally provided frame of frame image data;

transmitting the at least one of a frame of the combined frame image data and the at least one externally provided frame of frame image data to at least one of the plurality of graphics processors such that (i) at least one of the successive frames of frame image data from one or more of the graphics processors may include at least one of the at least

one externally provided frame of frame image data and the frame of the combined frame image data; and

producing a successive frame of the combined frame image data based on the at least one of the at least one externally provided frame of frame image data and the frame of the combined frame image data.

139. (original) The method of claim 110, further comprising:

receiving and storing common image data in a memory;

transmitting at least some of the common image data to at least some of the plurality of graphics processors such that (i) at least one of the successive frames of frame image data from one or more of the graphics processors may include at least some of the common image data; and

producing a successive frame of the combined frame image data based on the common image data.

140. (original) The method of claim 139, wherein the common image data include texture data.